

Conditions of Linear Relationships 2.11
p. 142-147

First Differences (Finite Differences) - when the values of the independent variable increase by 1 the differences between the set of dependent variables form a set of finite differences

This calculation is demonstrated on a Difference Table

x	y		x	y	$\Delta y, (y_2 - y_1)$
1	4		1	4	
2	6		2	6	$6 - 4 = 2$
3	8		3	8	$8 - 6 = 2$
4	10		4	10	$10 - 8 = 2$
5	12		5	12	$12 - 10 = 2$
6	14		6	14	$14 - 12 = 2$

When the first differences are all the same the relationship is said to be linear
When the first differences are different the relationship is said to be non-linear

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Demo 1 a) 2 and 3 on p.145

x	y	Δy
1	3	
2	6	$6 - 3 = 3$
3	9	$9 - 6 = 3$
4	12	$12 - 9 = 3$
5	15	$15 - 12 = 3$

Linear b/c first differences are the same

3) $y = mx + b$
 $(1, 2)$ $(2, 6)$
 x_1, y_1 x_2, y_2
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 2}{2 - 1} = \frac{4}{1} = 4$
 $y = 4x + b$
 $2 = 4(1) + b$
 $2 = 4 + b$
 $-2 = b$
 $y = 4x - 2$

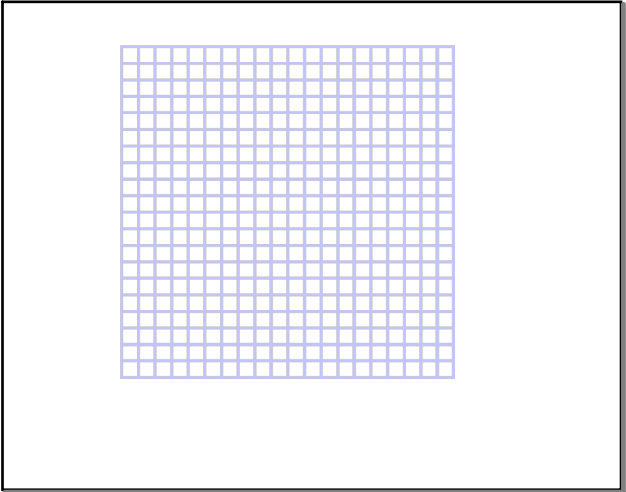
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q1 b) c) f) g)

2,3,5, 7, 12

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